Course: STAT-319
Term: 181
Homework # 1
Material: Chapter 2
Due Date: Sunday, 16-September-2018

Q1: A car rental agency has 19 compact cars and 12 intermediate-size cars. If four of the cars are randomly selected for a safety check, what is the probability of getting two of each kind?

Q2: The probabilities that a satellite launching rocket will explode during lift-off or have its guidance system fail in the flight are 0.0002 and 0.0005, respectively. Assuming independence find the probabilities that such a rocket will

a) not explode during lift-off;
b) explode during lift-off or have its guidance system fail in flight;
c) neither explode during lift-off nor have its guidance system fail in flight.

Q3: The following frequency table shows the classification of 90 students in their sophomore year of college according to their understanding of physics, chemistry and mathematics.

		Physics			
		Average		Extensive	
		Chemistry		Chemistry	
		Average	Extensive	Average	Extensive
Mathematics	Average	8	16	12	18
	Extensive	14	4	14	4

If a student is selected at random, find the probability that the student has

a) an extensive understanding of chemistry;
b) an extensive understanding of physics and an average understanding of mathematics and chemistry;
c) an extensive understanding of any two subjects and an average understanding of the third;
d) an extensive understanding of any one subject and an average understanding of the other two.

Q4: Refer to Q3. Given that a student, selected at random, is found to have an extensive understanding of physics, what is the probability that the student has

a) an extensive understanding of chemistry;
b) an extensive understanding of both chemistry and mathematics;
c) an extensive understanding of either chemistry or mathematics.

Q5: A large firm has 85% of its service calls made by a contractor, and a 10% of these calls result in customer complaints. The other 15% of the service calls are made by their own employees, and these calls have a 5% complaint rate. Find the

a) probability of receiving a complaint.
b) probability that the complaint was from a customer serviced by a contractor.

Q6: The next generation of miniaturized wireless capsules with active locomotion will require two miniature electric motors to operate each capsule. Suppose 20 motors have been invented but that, in spite of tests performed on the individual motors, 4 will not operate satisfactorily when placed into a capsule. If the scientist wishes to construct two capsules, with two motors each, find the probability that among the four randomly selected motors

a) all four operate satisfactorily;
b) three operate satisfactorily and one does not.